SHKLYAREVSKIY, I.N.

Comments on A.N. Tekuchev's article "Absorption and dispersion
of thin films of gold." Opt. i spektr. 10 no.6:810 Je '61.
(MIRA 14:8)

(Gold--Optical properties)
(Tekuchev, A.N.)

VLASENKO, N.A.; MILOSLAVSKIY, V.K.; SHKLYAREVSKIY, I.N.

Interference of luminescent radiation from sublimate
phosphors. Opt. i spektr. 11 no.3:403-409 S '61. (MIRA 14:9)
(Phosphors) (Luminescence)

PADALKA, V.G.; SHKLYAREVSKIY, I.N.

Determining the microcharacteristics of silver and gold from
the optical constants in the infrared spectral region and from
the conductivity at 82 and 295 K. Opt.i spektr. 11 no.4:527-
535 0 '61. (MIRA 14:10)
        (Silver-Spectra)   (Gold-Spectra)

32053

S/051/61/011/005/013/018

E202/E192

?4 3q50

AUTHORS: Shklyarevskiy, I.N., and Yarovaya, R.G.

TITLE: Optical properties of beryllium in the infrared region

PERIODICAL: Optika i spektroskopiya, v.11, no.5, 1961, 661-666

TEXT: Optical constants of high purity, vacuum deposited, opaque layers of beryllium in the region of $0.8 - 11 \mu$, and at 290 and 82 $^{\circ}$K, were studied. Dispersion curves were plotted from the refractive index and absorption measurements at $\lambda_B = 0.8 - 11 \mu$. These measurements were also carried out at 82 $^{\circ}$K, using a cryostat described in Ref.6 (V.G. Padalka, I.N. Shklyarevskiy, Opt. i spektr., v.3, 361, 1957). The position and shape of the dispersion curves at 82 $^{\circ}$K were substantially unchanged. The Hall constant R, and the statistical (hole) conductivity σ_0, measured on the same samples were found to be 5.6×10^{-3} e.m.u. and 1.3×10^4 ohm^{-1} cm^{-1} respectively. It was also found that within the above spectral region, the properties of beryllium can be fully defined by the free current carriers,

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32053
Optical properties of beryllium ...   S/051/61/011/005/013/018
E202/E192

Using the formulae for the normal skin effect, and taking into consideration the quantum character of the interaction between the free carriers and the infrared radiation, the authors determined the concentration, effective mass and frequency of collisions between the carriers. Finally, it was shown that the temperature dependence of the optical properties of beryllium is determined by the frequency of these collisions. There are 4 figures, 2 tables and 13 references: 7 Soviet-bloc and 6 non-Soviet-bloc. The English language references read as follows:

Ref 1: D.G. Avery, Proc. Phys. Soc., v.B65, 425, 1952.
Ref. 4: G.K.T. Conn, G.K. Eaton.
        Opt. Soc. Amer., v.44, 477, 1954.
Ref.12: R.W. Hill, P.L. Smith.
        Phil. Mag., Ser. 7, v.44, 636, 1953.
Ref.13: M.H. Cohen, Phil.Mag., Ser.8, v.3, 762, 1958.
SUBMITTED: December 26, 1960

Card 2/2

S/051/62/012/002/018/020
E032/E514

AUTHORS: Padalka, V.G. and Shklyarevskiy, I.N.

TITLE: Determination of the micro-characteristics of copper from the optical constants in the infrared region of the spectrum and the resistivity at 82 and 295°K

PERIODICAL: Optika i spektroskopiya, v.12, no.2, 1962, 291-297

TEXT: In a previous paper the authors reported measurements of the optical constants of copper at room temperature. However, these measurements were not accompanied by measurements of the resistivity and the effect of the oxide coating was not allowed for. In the present paper they report simultaneous measurements of the refractive and adsorptive indices of copper in the infra-red, and of the resistivity at 82 and 295°K.   These results are corrected for the presence of a thin film on the surface. The optical constants were measured in the wavelength range 1-12 μ on vacuum-evaporated layers. The cryostat described by the authors in Ref.7 (Opt. i spektr., 9, 119, 1960) and the method described by the second of the authors and V. K. Miloslavskiy (Ref.8: Opt. i spektr., 3, 361, 1957) were employed. The effect of the surface
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Determination of the ...

S/051/62/012/002/018/020
E032/E514

oxide was allowed for by assuming that the surface layer was 35 Å
thick and had a refractive index of n = 2. The corrected values
obtained for the refractive and absorptive indices μ' and $\mu\chi'$
(curves a and b respectively) are shown in Fig.2, in which the
open circles refer to 295°K and the points to 82°K. The correc-
tion for the surface layer increases the original values by 20 and
10% in the case of the refractive and absorptive indices,
respectively. The resistivity of the specimen was measured as a
function of thickness by the interferometer method. The results
are then used to determine the concentration of conduction
electrons, the velocity on the Fermi surface, and the frequencies
of electron-electron, electron-phonon and electron-impurity
collisions. The results are compared with measurements of the
electronic specific heat and the surface impedance in the radio-
frequency range. Table 2 gives the various micro-characteristics
of copper. In this table: T - temperature, N_α - concentration
of atoms in the film, N - concentration of electrons in the
conduction band, and ee, ef and ed refer to electron-electron,
electron-phonon and electron-impurity collision frequencies. The

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Determination of the ...   S/051/62/012/002/018/020
                                            E032/E514

subscript 0 denotes classical high-temperature values. Assuming that $\lambda = 6\ \mu$, it is found that the mean free path ℓ is approximately 300 and 460 Å at 295 and 82°K. It is estimated that the linear dimensions of the crystals forming the polycrystalline film are of the order of 1000 Å ($\sim v/\nu^{cd}$). Finally, present results yield $v/\sqrt{N} = 6.4 \times 10^{-4}$ cm$^{5/2}$ sec^{-1} and $v/N = 2.9 \times 10^{-15}$ cm^{4}sec^{-1}, while the specific heat and surface impedance measurements yield 4.5×10^{-4} and 1.8×10^{-15} respectively. Acknowledgments are expressed to K. D. Sinel'nikov for discussions and interest. There are 5 figures and 2 tables.

SUBMITTED: February 14, 1961

Table 2

	T (в °K)	$N_a \cdot 10^{-22}$ (в см$^{-3}$)	$N \cdot 10^{-22}$ (в см$^{-3}$)	$c_o \cdot 10^{-7}$ (в сек$^{-1}$)$^{3/2}$	$\nu' \cdot 10^{-7}$ (в сек$^{-1}$)	$\nu'' \cdot 10^{-7}$ (в сек$^{-1}$)	$\nu_d \cdot 10^{-7}$ (в сек$^{-1}$)	$\mu \cdot 10^{-4}$ (в см/сек.)
Uncorrected for surface film	295	8.5	4.0	34.7	1.54	1.74	1.18	1.7
	82	8.5	4.0	2.68	0.23	0.77	1.20	1.6
Corrected for surface film	295	8.5	4.95	38.6	1.95	2.20	1.46	1.4
	82	8.5	4.95	2.98	0.28	0.97	1.48	1.4

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SHKLYAREVSKIY, I.N.; NOSULENKO, N.A.

Experimental test of Drude's formulae. Opt. i spektr. 12
no.6:769-771 Je '62.   (MIRA 15:5)
(Optical measurements)

S/051/62/012/006/018/020
E032/E414

AUTHORS: Shklyarevskiy, I.N., Miloslavskiy, V.K.

TITLE: On the magnitude and sign of the phase difference
$\Delta = \delta_p - \delta_s$

PERIODICAL: Optika i spektroskopiya, v.12, no.6, 1962, 793-795

TEXT: In a previous paper (Opt. i spektr., v.9, 1960, 640)
the authors discussed the phase difference $\Delta = \delta_p - \delta_s$ where
δ_p and δ_s are the phase shifts of the p and s components of
the electric vector at a given angle of incidence of light on the
surface of a metal. It was shown that the magnitude and sign of
this difference can be unambiguously determined by direct
measurements and such measurements have in fact now been carried
out.   However, N.Ya.Gorban' and I.A.Shaykevich (Opt. i spektr.,
v.11, 1961, 750) have obtained results which do agree with these
conclusions.   A further analysis of the Fresnel reflection
coefficients is now used to show that the present authors'
conclusions reported in the previous paper still hold and that
Gorban' and Shaykevich have used an incorrect interpretation.
There are 2 figures.
SUBMITTED: January 12, 1962
Card 1/1

SHKLYAREVSKIY, I.N.

"Optical properties of metals" by A.V.Sokolov. Reviewed by I.
N. Shkliarevskii. Opt. i spektr. 12 no.5:805-306 Je '62.
(MIRA 15:5)
(Metals—Optical properties) (Sokolov, A.V.)

39869

S/051/62/013/002/008/014

E032/E514

24.3300

AUTHORS: Vlasenko, N.A., Miloslavskiy,V.K. and Shklyarevskiy,I.N.

TITLE: On the origin of Brewster and super-position fringes

PERIODICAL: Optika i spektroskopiya, v.13, no.2, 1962, 250-255

TEXT: The conditions necessary for the appearance of Brewster fringes in white light and super-position fringes in monochromatic light are discussed in the general case with allowance for multiple reflections within each plate. The two types of fringes are carefully defined and the differences between them are brought out. In each case an explicit relation is given for the intensity distribution. In the case of Brewster fringes, the corresponding intensity-distribution formula is used to establish a condition for the continuity of the achromatic fringe. In fact the achromatic fringe is continuous (visual observation) provided $t\Delta\nu > 2.5$, where t is the plate thickness and $\Delta\nu$ is the wave number difference corresponding to the spectral range employed. The final section is concerned with the analysis of Brewster fringes which are produced when a two-beam interferometer, e.g. the Jamin interferometer, is crossed with a silvered plane-

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On the origin of Brewster and ...   S/051/62/013/002/008/014
                                    E032/E514

parallel plate. Analysis of the corresponding intensity
distribution shows the presence of several achromatic fringes
and it is suggested that these fringes may be useful in speeding
up the adjustment of two-beam interferometers. They may also be
useful in rapid order counting and the measurement of the thickness
of plane-parallel layers.   There are 5 figures.

SUBMITTED: July 17, 1961

.Card 2/2

S/051/63/014/002/010/026
E032/E114

AUTHORS: Shklyarevskiy, I.N., and Nosulenko, N.A.

TITLE: Phase relations at the separation boundary between two media

PERIODICAL: Optika i spektroskopiya, v.14, no.2, 1963, 247-251

TEXT: In accurate interferometric measurements the phase change on reflection at a separation boundary must be correctly taken into account. In an earlier paper (ZhTF, v.26, 1956, 333) it was pointed out that there was some doubt as to the magnitude and sign of the phase change. Some discussion arose in the literature as a result of that paper, and it was therefore decided to re-examine this problem in greater detail. The results of this analysis are now reported. Analysis of new experimental data and of calculations is used to show that the conclusions reached in the previous paper are in fact correct, and that the phase change on reflection δ for the p- and s-components of the amplitude reflection coefficient is given by:

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Phase relations at the separation ...   S/051/63/014/002/010/026
E032/E114

$$\tan\ (\delta_p - \pi) = \tan \delta'_p = \frac{2\mu_o \mu \chi \cos \varphi}{\mu_o^2 - \left(\mu^2 + (\mu\chi)^2\right)\cos^2 \varphi}$$

$$\tan\ (\delta_s - \pi) = \tan \delta'_s = \frac{2\mu_o \mu \chi \cos \varphi}{\mu_o^2 \cos^2 \varphi - \mu^2 - (\mu\chi)^2}$$

$$(5)$$

where the light is assumed to travel from the medium with refractive
index μ_o, the second medium has a refractive index $\tilde{\mu} = (1 - i\chi)$,
χ is the angle of refraction, and φ is the angle of incidence.
These formulas hold provided $\mu_o^2 \sin^2 \varphi$ is small in comparison
with $\tilde{\mu}^2$.

There are 2 figures.

SUBMITTED: May 12, 1962

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S/051/63/014/002/011/026
E039/E120

AUTHORS: Shklyarevskiy, I.N., and Yarovaya, R.G.

TITLE: Elimination of the effect of oxide films on the results of measurements of the optical constants of aluminium

PERIODICAL: Optika i spektroskopiya, v.14, no.2, 1963, 252-255

TEXT: The kinetic growth of the layer of oxide on the surface of aluminium obtained by evaporation from a tungsten filament onto a glass plate in a vacuum chamber is investigated. The chamber is provided with two windows to enable the optical constants to be measured. A pressure of 5×10^{-5} mm Hg is maintained by means of an oil diffusion pump with a liquid nitrogen trap and a charcoal absorption pump. The optical constants are determined by the method of P. Drude (Wied. Ann., v.36, 1889, 865) using a mica $\lambda/4$ plate as a compensator. It is verified that the optical constants of the freshly evaporated Al surface do not change after ~8 hours under vacuum. These values are therefore taken as the optical constants for the oxide free surface. After exposure to atmosphere the thickness of the oxide layer and the optical constants are measured at intervals up to 100 hours. It is shown that the

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L 11141-63   RWT(1)/BDS--AFFTC/ASD   S/0051/63/014/006/0805/0808
ACCESSION NR: AP3002788   5/

AUTHOR: Shklyarevskiy, I. N.; Nosilenko, N. A.

TITLE: Phase shifts in reflection of light from metal surfaces coated with thin dielectric films

SOURCE: Optika i spektroskopiya, v. 14, no. 6, 1963, 805-808

TOPIC TAGS: reflection phase shifts, dielectric coatings, coated optics, ZnS, cryolite

ABSTRACT: Various devices (special mirrors, filters, etc.) combining metallic and dielectric coatings are coming into use. There are, however, no data regarding the phase shift of light reflected from dielectric coated metal surfaces as a function of the coating thickness; the purpose of this study was to obtain such data. The phase shifts were measured by an interferometric procedure with reference to lines of equal chromatic order. The specimens were prepared as described in the authors' earlier work (Optika i spektro., 13, 769, 1962). Part of the interferometric plate coated with an opaque silver layer was covered with a dielectric film; the other side of the plate (facing the spectrograph slit) was coated with a partially transparent silver layer. (See Enclosure 1) The lines

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L 11141-63

ACCESSION NR: AP3002788

of equal chromatic order were photographed with the aid of an ISP-67 spectrograph. The dielectric coatings were cryolite and zinc sulfide. The measurement results (see Enclosure 2) agree with the results of calculations. Initially the phase jump decreases with increasing coating thickness and drops to zero at coating thicknesses of 320, 360 and 410 Angstrom for ZnS and 780, 820 and 890 Angstrom for cryolite for wavelengths of 520, 5600 and 6000 Angstrom, respectively. With further increase in film thickness the jump becomes negative, that is, the reflected wave lags in phase behind the incident wave. Orig. art. has: 8 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 10Oct62   DATE ACQD: 15Jul63   ENCL: 002

SUB CODE: 00   NO REF SOV: 009   OTHER: 000

Card 2/2

L 18751-63   EWP(q)/EWT(m)/BDS   AFFTC/ASD   JD/JG   S/2941/63/001/000/0261/0263

ACCESSION NR: AT3002231

AUTHORS: Pavlova, Ye. N.; Shklyarevskiy, I. N.

TITLE: Preparation technique of ZnS-Mn sublimate phosphors

SOURCE: Optika i spektroskopiya; Sbornik statey. v. 1: Lyuminestsentsiya. Moscow, Izd-vo AN SSSR, 1963, 261-263

TOPIC TAGS: radiation, phosphor , optics

ABSTRACT: The dependence of optical characteristics of the sublimate-phosphor ZnS-Mn on the mode of preparation was studied. The rate of heating was considered as the essential parameter in preparing the specimen. The radiation intensities of ZnS-Mn specimens, heated at 490C in 3, 5, 10, and 30 min intervals, were obtained (Fig. 1 /see enclosure/ - curves 1, 2, 3, and 4 respectively). Maximum radiation intensities of specimens prepared at temperatures of 410, 450, 470, 490, 520, and 550 were also studied (Fig. 2 /see enclosure/ - curves 1 to 6 respectively). It is shown that at high temperatures maximum intensity is attained in a relatively short heating time. "The author acknowledges the help of N. A. Vlasenko." Orig. art. has: 2 figures.

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SHKLYAREVSKIY, I.N.; NOSULENKO, N.A.

Phase shifts due to the reflection of light from metallic
surfaces coated with thin dielectric films. Opt. i spektr.
14 no.6:805-808 Je '63.   (MIRA 16:8)

(Interferometry)

ACCESSION NR: AP4011488   S/0051/64/016/001/0085/0091

AUTHOR: Shklyarevskiy, I.N.; Yarovaya, R.G.

TITLE: Quantum absorption in aluminum and indium

SOURCE: Optika i spektroskopiya, v.16, no.1, 1964, 85-91

TOPIC TAGS: quantum absorption, photon absorption, infrared absorption, energy band
structure, Brillouin zone, aluminum, indium, thin films

ABSTRACT: The optical constants – index of refraction and absorption coefficient –
of thin aluminum and indium films were measured in the wavelength region from 0.4 to
2 microns. In the present paper there are reported only the results pertaining to
quantum absorption associated with interband electron transitions. The results of
measurement in the infrared region of the spectrum will be published elsewhere. The
aluminum specimens were prepared by rapid deposition from a tungsten evaporator onto
glass substrates at a pressure of about 2×10^{-5} mm Hg. The purity of the initial
aluminum was 99.999%. In arriving at the final values for the refraction indices and
absorption coefficients for the aluminum layers corrections were made for oxidation
of the surface on the basis of the results obtained in an earlier investigation (I.

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ACC.NR: AP4011488

N.Shklyarevskiy and R.G.Yarovaya,Opt.i spektr.14,252,1963). The indium layers were
prepared by evaporation from a molybdenum boat; the initial purity of the indium
was 99.9999%. As in the case of the aluminum films, deposition was stopped prior to
complete evaporation of the material from the boat. Some difficulties were encoun-
tered in preparing the indium layers, but it was found the smooth opaque specimens
can be obtained by slow (about 1 minute) deposition under high vacuum onto glass
substrates cooled to liquid nitrogen temperature. The indium films also oxidize, but
so far it has not been possible to allow for the influence of the oxide films on the
optical constants. The values of the index of refraction μ and the absorption $\mu\chi$ for
aluminum in the wavelength range from 0.4 to 2 μ are tabulated as are the correspon-
ding values for indium in the wavelength range from 0.475 to 0.96 μ. The variation
of the optical constant with wavelength is also plotted. It was found that both the
investigated metals have a quantum absorption band in the investigated spectral re-
gion, associated with interband electron transitions. In the case of aluminum this
interband absorption can be separated from intraband absorption. The experimental
data are discussed and compared with the results of calculations of the energy bands
in aluminum, carried out by V.Heine (Proc.Roy.Soc. A240,340 & 361,1957) and W.A.
Harrison (Phys.Rev.118,1182,1960). Orig.art.has: 4 formulas, 3 figures and 2 tables.

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S/0051/64/016/002/0304/0309

ACCESSION NR: AP4020934

AUTHOR: Kostyuk, V.P.; Shklyarevskiy, I.N.

TITLE: Optical properties of chromium mirrors in the visible region

SOURCE: Optika i spektroskopiya, v.16, no.2, 1964, 304-309

TOPIC TAGS: optical constant index of refraction, absorption coefficient, optical anisotropy, chromium layer, chromium coating, chromium mirror

ABSTRACT: Preliminary studies of the optical properties of chromium coatings deposited under vacuum showed that these seem to vary from specimen to specimen in an erratic manner. Accordingly, the present investigation was undertaken in order to determine how the optical constants of chromium mirrors depend on the preparation conditions. The chromium coatings were deposited by vacuum (5×10^{-5} to 2×10^{-6} mm Hg) evaporation from tungsten crucibles onto glass or quartz substrates, located at a distance of 15-20 cm from the crucible. The initial material was vacuum remelted electrolytic chromium; the substrates were outgassed and heated to different temperatures in the range from 45 to 600°C. In agreement with the results of G.S.Mikhaylov, G.M.Persnyakova and O.M.Akimovich (Ukr.fiz.zhur.,6,73,1962) it was found that

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ACCESSION NR: AP4020934

the molecular Cr beam has a high "pumping" capacity and that the deposited Cr is a good "getter". This was utilized in depositing the test coatings. The Cr coatings, particularly those on heated substrates, are characterized by high mechanical strength, and, thus, are suitable as undercoatings for high-quality silver or aluminum mirrors. The optical properties were measured by the method of re-eatablishment of plane polarization incident to three-fold reflection from two parallel mirrors; the earlier experimental arrangement (Opt.i spektr.,3,361,1957) was modified somewhat to permit working with smaller mirrors. The optical constants μ and $\mu\chi$ were measured for λ = 550 mμ. μ is the index of refraction and $\mu\chi$ is the coefficient of absorption, as calculated from the measured phase difference and azimuth angle of the re-established polarization. The dependences of the constants on the rate of deposition and the temperature of the substrate are shown in Figs.1 and 2 of the Enclosure. (Fig.2.also gives the variation of the conductivity of the Cr coatings.) Further measurements were made to determine the dependence of the optical constants on the vacuum, aging and annealing; these factors, when varied within reasonable limits, appear to have little effect on the optical properties. Some experiments were also performed to evaluate the anisotropy associated with oblique deposition; the anistoropy is significant and is not eliminated even by prolonged annealing.

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ACCESSION NR: AP4020934

Finally, dispersion curves (wavelength dependences) for μ and $\mu\chi$ were obtained for two coatings deposited at the rate of 250-300 Å/sec with normal incidence under a vacuum of about 2×10^{-6} mm Hg onto a substrate heated to 45° and a substrate heated to 400°C. The results are shown in Fig.3 of the Enclosure; the indicated values of the optical constants are relative, rather than the true or absolute values. In the aggregate the data indicate that the crystal structure of layers deposited onto hotter substrates is more nearly perfect.. Orig.art.has: 2 formulas and 5 figures

ASSOCIATION: none

SUBMITTED: 15May63   DATE ACQ: 02Apr64   ENCL: 02

SUB CODE: PH   NR REF SOV: 008   OTHER: 001

Card 3/33

ACCESSION NR: AP4020961   S/0051/64/016/003/0464/0490

AUTHOR: Lelyuk, L.G.; Shklyarevskiy, I.N.; Yarovaya, R.G.

TITLE: Optical properties of liquid mercury and gallium in the visible and near infrared regions of the spectrum

SOURCE: Optika i spektroskopiya, v.16, no.3, 1964, 484-490

TOPIC TAGS: optical constant, refraction index, absorption coefficient, liquid mercury, mercury, liquid gallium, gallium, Drude conduction theory, Zener theory, free electron, conduction electron

ABSTRACT: In addition to its intrinsic interest, investigation of the optical properties of metals can yield information that can be useful in theoretical interpretation of the microcharacteristics. This has been true of metals in the solid state, where the results of optical measurements have aided development of the theory of free electrons, energy band structure, etc. The situation is different where metals in the liquid state are concerned: thus, to date there is no satisfactory theory characterizing the behavior of conduction electrons in liquid metals. The available data are scanty; in fact, the data on the optical constants of mercury (the most

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ACCESSION NR: AP4020961

thoroughly investigated liquid metal) and gallium are conflicting: according to the data of L.G.Schulz (Adv.Phys.6,102,1957) the Drude conduction theory is valid for Hg and Ga in the entire range covered by Schulz's measurements, whereas according to J.N.Hodgson (Phil.Mag.4,183,1959; Ibid.5,272,1960; Ibid.6,509,1961; Ibid.8,229, 1963) deviations from the free electron theory obtain for almost all liquid metals in the long wavelength region. Accordingly, in the present work there were measured the optical constants — the index of refraction μ and absorption coefficient μX — of mercury and gallium in the visible and near infrared regions by the earlier developed method of re-establishment of plane polarization (I.N.Shklyarevskiy and V. K.Miloslavskiy, Opt.i spektr.3,361,1957). The experimental results are tabulated and compared with the data of other authors (there is substantial disagreement and the reasons for this are discussed). The results are tentatively interpreted from the standpoint of the theory of free electrons (the Drude theory is only partially applicable).   Orig.art.has: 9 formulas, 5 figures and 3 tables.

ASSOCIATION: none

SUBMITTED: 18Apr63   DATE ACQ: 02Apr64   ENCL: 00

SUB CODE: PH   NR REF SOV: 005   OTHER: 011

Card 2/2

ACCESSION NR: AP4020967   S/0051/64/016/003/0517/0521

AUTHOR: Lupashko, Ye.A.; Shklyarevskiy, I.N.

TITLE: Antireflecting dielectric multilayers

SOURCE: Optika i spektroskopiya, v.16, no3, 1964, 517-521

TOPIC TAGS: metal coating, metal reflection suppression, antireflection coating,
dielectric coating, absorption enhancement, photosensitive layer, photoelement,
cryolite, zinc sulfide, aluminum chr

ABSTRACT: In an earlier study (I.N. Shklyarevskiy and A.A.Avdeyenko, Opt.i spektr.
3,573,1959) there was demonstrated the possibility of enhancing the transmittance
of partially transparent metal coatings by means of granular silver films deposited
between the metal coating and the substrate. Subsequently P.G.Kard (Ibi.9,243,1960)
proposed a theory indicating the possibility of enhancing the transmittance of met-
al coatings by means of dielectric films in contact with the metal coating on both
the exposed (air) side and on the substrate side. In the first study mentioned above
enhancement of transmittance was understood to mean increase of the transmission
coefficient T either by reduction of the absorption coefficient A together with re-

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ACCESSION NR: AP4020967

duction of the reflection coefficient R' from the substrate side but no change in R on the "air" side, or reduction of both A and R. Kard considered enhancement of transmittance only due to reduction of A, even if this is accompanied by some increase of T and R. In the present paper there is proposed and theoretically justified a procedure for depositing antireflecting dielectric layers onto an opaque metal layer; as a result of sharp decrease of the reflection coefficient, the absorption coefficient of the metal coating is greatly increased. Thus, deposition of such antireflecting layers onto the light sensitive layer of a radiation detector (photoelement) can significantly improve the detector response. Experiments were carried out with aluminum and chromium layers coated with multiple layers of cryolite and zinc sulfide, each a quarter wavelength thick. Application of two layers results in substantial reduction in reflection. Increase in the number of dielectric layers from two to four leads to further decrease of the reflection; further increase to six dielectric layers, however, brings about an increase in reflection. Thus, by deposition of multiple layer dielectric coatings it is feasible to suppress reflection of light from metal coatings. The spectral range of effective suppression of reflection is the narrower, the higher the intrinsic reflection coefficient of the metal. For metals with R = 50% reflection can be reduced to virtually nil in the entire visible region. Orig.art.has: 5 formulas and 4 figures.

Card 2/3

ACCESSION NR: AP4032879   S/0051/64/016/004/0712/0713

AUTHOR: Avdeyenko,A.A.; Akopov,V.M.; Kramarenko,N.L.; Naboykin,Yu.V.; Shklyarevskiy, I.N. .

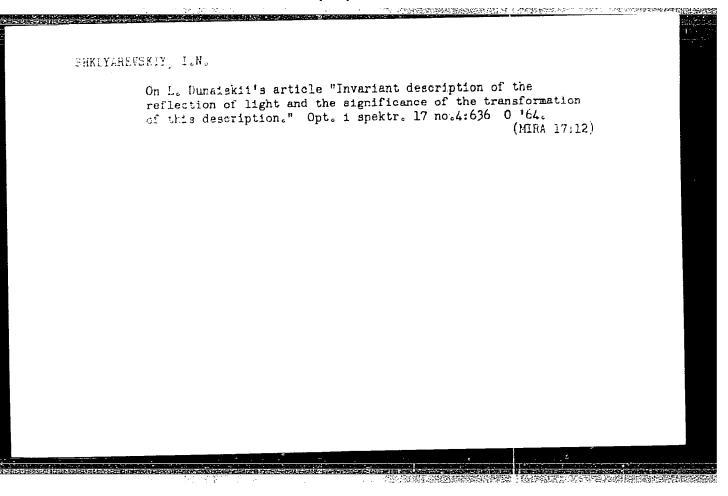TITLE: Concerning measurement of high reflection coefficients

SOURCE: Optika i spektroskopiya, v.16, no.4, 1964, 712-713

TOPIC TAGS: reflection coefficient, reflection coefficient measurement, mirror, silver mirror

ABSTRACT: In connection with designing interference instruments (for example, Fabry-Perot etalons) and lasers it is essential to know the reflection coefficient of the mirror components, and the higher the coefficient the more important is accuracy of the measurement result. In the present paper there is proposed a procedure and setup, based on multiple reflection, designed for accurate measurement of the reflection coefficients of mirrors with a high coefficient. The requisite evaluation formulas for two-fold and eight-fold reflection (the latter was employed by the authors) are adduced. A diagram of the setup is shown; it consists essentially of a collimated source, a beam splitting plate, and an appropriate photocell with a

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ACCESSION NR: AP4032879

frosted glass window. The setup and procedure were used to determine the reflection coefficients of three silver mirrors, prepared by simultaneous vacuum evaporation, for wavelengths of 550, 600 and 650 mµ; the estimated measurement accuracy is within ±0.4%. Orig. art.has: 3 formulas, 2 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 26Jul63

SUB CODE: OP   NR REF SOV: 001

ENCL: 00

OTHER: 003

Card 2/2

SHKLYAREVSKIY, I.N.

On L. Dunaiskii's article "Invariant description of the reflection of light and the significance of the transformation of this description." Opt. i spektr. 17 no.4:636 O '64.

(MIRA 17:12)

ACCESSION NR: AP4035430   S/0051/64/016/005/0888/0893

AUTHOR: Shklyarevskiy, I.N.; Nosulenko, N.A.

TITLE: Measurement of the dispersion of the phase discontinuity occurring in re-
flection of light from metals

SOURCE: Optika i spektroskopiya, v.16, no.5, 1964, 888-893

TOPIC TAGS: light reflection, coated optics, reflection phase discontinuity, absorp-
tion coefficient, silver, aluminum, copper, antimony

ABSTRACT: There have been several studies devoted to measurement of the dispersion
of the phase discontinuity δ occurring incident to reflection of light from silver
interferometric coatings; in most cases, however, there was determined the disper-
sion of the complementary quantity $\delta' = \pi - \delta$. The formulas for calculating the dis-
persion of δ, taken from various sources in the literature and applicable in diffe-
rent cases, are adduced. In the present study measurements were carried out for re-
flection from silver, aluminum, copper and antimony coatings. The interferometric
measurement procedure employed is described at some length: it involves positioning

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ACCESSION NR: AP4035480

the coated interferometer plates in front of the slit of a spectrograph (an ISP-67 spectrograph with a 1500 mm focal length camera was used) so as to obtain lines of equal chromatic order in transmitted light. The results are presented in figures together with calculated curves; for the most part the experimental points fall on the curves given by the formula for oxide coated metals, derived earlier by the authors (Opt.i spektr.14,247,1963) and are reasonably close to the formula based on the index of refraction and the absorption coefficient. The values of the absorption coefficient for silver and aluminum deduced from the experimental data agree with the results of measurements by polarization methods. Orig.art.has: 17 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 26Jul63   DATE ACQ: 22May64   ENCL: 00

SUB CODE: OP   RE REF SOV: 007   OTHER: 007

Card 2/2

L 5425-66   E⅋T(1)/EPF(c)   IJP(c)   WW/GG

ACCESSION NR: AP5019767

AUTHOR: Shklyarevskiy, I. N.; Golovadova, V. I.

TITLE: Wide-angle interference of light

SOURCE: Optika i spektroskopiya, v. 19, no. 2, 1965, 292-294

UR/0051/65/019/002/0292/0294
535.417

TOPIC TAGS: light interference, luminescence, coherent light, luminescence center, light reflection coefficient

ABSTRACT: This is a continuation of earlier work by the authors (Opt. i spektr. v. 17, 765, 1964 and earlier papers), where wide-angle interference of luminescence light was produced in a plane-parallel dielectric (mica) layer bounded by a silver film and air. The present article deals with a simpler experimental proof of the coherence of the light radiated by the luminescence centers in this system in opposite directions. The method is based on performing the measurements for two values of the reflection coefficient of the dielectric layer (mica) at the air boundary (by applying a layer of glycerine). Formulas for the expected variation of the intensity of the interference fringes are derived for this case and compared with the formulas of the earlier papers. The measurement results confirmed the theoretical calculations. Orig. art. has: 2 figures and 2 formulas.

Card 1/2

L 5425-66

ACCESSION NR: AP5019767

ASSOCIATION: none

SUBMITTED: 24Dec64

NR REF SOV: 004

ENCL: 00

OTHER: 000

SUB CODE: OP

Card 2/2

L 34545-65   EWT(1)/EEC(t)/EEC(b)-2   Pi-4   IJP(c)

ACCESSION NR: AP4048751   S/0051/64/017/005/0765/0770

AUTHORS: Shklyarevskiy, I. N.; Miloslavskiy, V. K.; Goloyadova, V. I.

TITLE: Wide-angle interference of light

SOURCE: Optika i spektroskopiya, v. 17, no. 5, 1964, 765-770

TOPIC TAGS: light interference, luminescence, coherent optical
propagation

ABSTRACT: A quantitative study was made of interference of lumines-
cence light with an angle φ = 180° between the interfering beams.
Such measurements have become feasible only recently by the avail-
ability of modern equipment with which to measure weak radiation. A
thin luminescent layer (solution of pyrazoline and polystyrene in an
organic solvent) was deposited on a thin mica plate (5--10 μ). After
evaporation of the solvent the layer had approximately the same re-
fractive index as the mica. The second side of the mica was covered

Card 1/4

L 34545-65

ACCESSION NR: AP4048751
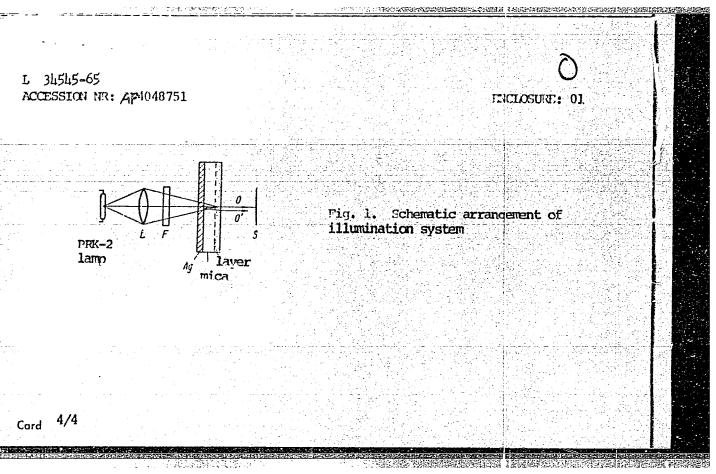
with a semitransparent layer of silver (reflection coefficient on
the mica side about 85% for λ = 550 nm. The sample was placed in
front of the spectroscope slit and illuminated, as shown in Fig. 1
of the Enclosure by ultraviolet light (λ = 365 nm). The lumines-
cence propagating along the normal from the sample surface was
passed through a monochromator and recorded with a photoelectric set-
up using an FEU-29a photomultiplier. A system of interference
lines of constant wavelength was produced by the plane-parallel gap
comprising the mica and the luminescent layer. The visibility of
the interference lines was recorded and compared with calculations
based on the plane-wave approximation. The experimental visibility
was lower than calculated, owing to non-uniformity of the thickness
of the luminescent layer, light scattering by various defects, and
other unaccounted for factors. Orig. art. has: 5 figures.

ASSOCIATION: None

Card 2/4

L 34545-65
ACCESSION NR: AP4048751

SUBMITTED: 18Nov63   ENCL: 01

SUB CODE: OP   NR REF SOV: 007   OTHER: 003

Card 3/4

L 34545-65
ACCESSION NR: AP4048751

ENCLOSURE: 01

PRK-2
lamp

L   F

Ag   layer
mica

0
0'

S

Fig. 1. Schematic arrangement of
illumination system

Card   4/4

L 21174-65   EWT(1)/EWP(e)/EWT(m)/T/EEC(b)-2   RAEM(a)/IJP(c)   WH

ACCESSION NR: AP5003029   S/0051/65/018/001/0102/0108

AUTHOR: Shklyarevskiy, I. N.; Nosulenko, N. A.; Ryazanov, A. N.   B

TITLE: Investigation of relative localization of interference fringes in trans-
mitted and reflected light

SOURCE: Optika i spektroskopiya, v. 18, no. 1, 1965, 102-108

TOPIC TAGS: optical interference, interference frige, silver film, mica, trans-
mitted light, reflected light, phase shift

ABSTRACT: The shift in the interference minima of reflected light, relative to
the maxima of the transmitted light, were measured in silvered mica strips with
the aid of lines of equal chromatic order, as a function of the thickness of the
silver layer, with an aim at ascertaining whether these shifts are affected by
the thickness and effective optical constants of the silver layers. The surface
of a plane-parallel mica strip was covered with a partially transparent layer of
silver with approximate thickness 500 Å, and on one third of the opposite surface.
The investigated layer of silver was deposited on the remaining two thirds, as
shown in Fig. 1 of the enclosure, which shows also a diagram of the optical system

Card 1/3

L 21174-65
ACCESSION NR: AP5003029 O

employed. The phase jumps, resulting from the reflection of light from the
system comprising mica + silver layer + air, and corresponding to different
thicknesses of silver layers, were determined for silver layers 400, 500, and
600 Å thick and for wavelengths ranging from 450 to 630 nm. The results do not
differ greatly from the theoretical values, and the reasons for differences are
briefly discussed. Orig. art. has: 7 figures, 13 formulas, and 1 table.

ASSOCIATION: None
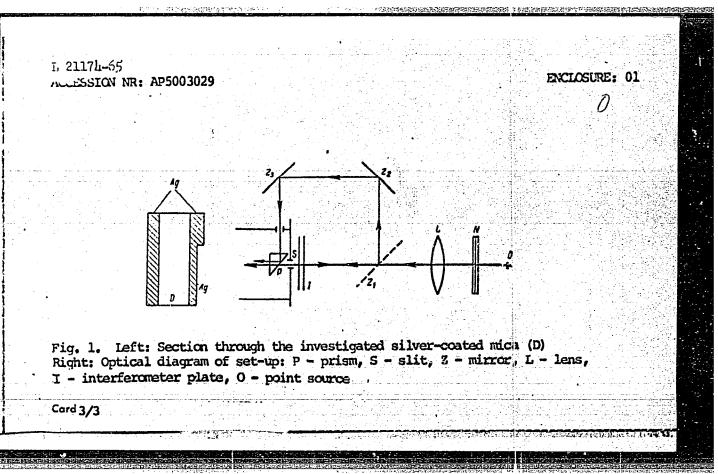
SUBMITTED: 06Dec63   ENCL: 01   SUB CODE: OP

NR REF SOV: 010   OTHER: 004

Card 2/3

L 21174-65
ACCESSION NR: AP5003029

Fig. 1. Left: Section through the investigated silver-coated mica (D)
Right: Optical diagram of set-up: P - prism, S - slit, Z - mirror, L - lens,
I - interferometer plate, O - point source

Card 3/3

L 44813-65   EWT(1)/EPA(ε)-2/EEC(t)   Pt-7/Pl-4   IJP(c)   GG

ACCESSION NR: AP5011121

UR/0051/65/018/004/0661/0667

AUTHOR: Shklyarevskiy, I. N.; Lupashko, Ye. A.

30
27
B

TITLE: Multilayer coatings with selective reflectivity

SOURCE: Optika i spektroskopiya, v. 18, no. 4, 1965, 661-667

TOPIC TAGS: multilayer coating, dielectric coating, dielectric mirror, reflection coefficient, transmission coefficient, selective reflection, interference mirror, *21* cryolite, zinc sulfide

ABSTRACT: It is pointed out in the introduction that although there are many methods for preparing, analyzing, and synthesizing multilayer dielectric coatings with prescribed optical characteristics, the calculations are laborious and call for the use of computers, so that simple experimental means are desirable. The authors have therefore prepared and investigated interference mirrors of high reflectivity and sufficiently narrow spectrum, by alternately depositing in vacuum layers with high (zinc sulfide) and low (cryolite) refractive indices. The technique used was the same as described by Ch. Dufour (Ann. de Phys. v. 6, 5, 1951). The spectral curves of the transmission and reflection coefficients were plotted with apparatus

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L 44813-65

ACCESSION NR: AP5011121

likewise described by Dufour. Coatings of two types of glass: HL. ... H. (2n + 1)L.H.
... L.H. - air and   - H.(2n + 1)L...H.(2n + 1)L. H - air were investigated
(H - zinc sulfide layer, L - cryolite layer, each of quarter-wave thickness, n = 1,
2, 3, ...). The results agreed with earlier theoretical and experimental re-
searches by others. They also show that, for an equal number of layers and for an
equal thickness of cryolite, a changeover from interference mirrors of the first
type to that of the second type leads to a narrowing of the spectral region of high
reflection and to broadening of the region with low reflection. A limit is imposed
on the attainable narrowing of the high-reflection region by the light scattering
produced when the thickness of the even layers is increased. "The authors thank
A. F. Prikhot'ko, V. L. Broude, and M. S. Soskin, whose initiative contributed to
the performance of this work." Orig. art. has: 4 figures and 2 formulas. [02]

ASSOCIATION: none

SUBMITTED: 07Mar64   ENCL: 00   SUB CODE: EM, OP

NO REF SOV: 008   OTHER: 001   ATD PRESS: 3257

mac
Card 2/2

L 64503-65   EPF(c)/EWT(1)/EWT(m)/EWP(b)/EWP(t)   IJP(c)   GG/WW/JD/JH

ACCESSION NR: AP5012610   UR/0051/65/018/005/0832/0837
                                              535.321 + 535.241:546.57

AUTHORS: Yarovaya, R. G.; Shklyarevskiy, I. N.

TITLE: Investigation of the quantum absorption of light in silver

SOURCE: Optika i spektroskopiya, v. 18, no. 5, 1965, 832-837

TOPIC TAGS: light absorption, silver, optic constant, refractive
index, optic transmission, optic transition, absorption edge

ABSTRACT: The purpose of the investigation was to determine the
effect exerted on the optical properties of silver in the visible
and ultraviolet regions by the presence of quantum-absorption bands.
To this end, the authors measured the optical constants of silver
layers deposited in vacuum.   The measurements were made in the
0.267 -- 1.4 µ range.   In the 1.4 -- 3.75 µ the obstacle constants
were measured by the method of reconstructed linear polarization,
described by one of the authors elsewhere (Shklyarevskiy, with V. K.

Card 1/3

L 64503-65

ACCESSION NR: AP5012610

Miroslavskiy, Opt. i spektr. v. 3, 361, 1957). At lower wavelengths
the Avery method was used (D. J. Avery, Proc. Phys. Soc. v. B65,
425, 1952). The values obtained for the refractive index and for
the absorption are compared with the results of others. The fre-
quency dependence of the optical transmission near the edge of the
quantum-absorption band is analyzed and certain conclusions are
drawn with respect to the character of the observed interband trans-
itions. The optical conductivity of the free electrons is calculated,
and the difference between the experimental and calculated values of
the optical conductivity of the film yields the contribution of the
interband transitions. It is concluded that the observed quantum
absorption in silver is connected with direct allowed transitions
near that point in momentum space, where the energy distance between
the corresponding bands has a minimum. The transitions at this
point determine naturally the long wave edge of the absorption band.
The plasma frequency of the electrons in the silver is calculated on
the basis of the author's own measurements and those made by others,
and is found to be very close to the experimentally observed value,

Card 2/3

L 64503-65
ACCESSION NR: AP5012610

3

5.44×10^{15} sec^{-1}. (The calculated value is 5.74×10^{15} sec^{-1}). The difference between these values is explained. 'The authors thank V. K. Miroslavskiy for a discussion of the work and valuable advice.' Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: None

SUBMITTED: 08Feb64   ENCL: 00   SUB CODE: OP

NR REF SOV: 007   OTHER: 010

Card 3/3

L 64502-65

ACCESSION NR: AP5012613   UR/0051/65/018/005/0853/0857
                                       535.394

AUTHORS: Shklyarevskiy, I. N.; Kostyuk, V. P.; Lelyuk, L. G.;
Yarovaya, R. G.

TITLE: On the magnitude and sign of the phase difference arising
in the case of total internal reflection

SOURCE: Optika i spektroskopiya, v. 18, no. 5, 1965, 853-857

TOPIC TAGS: light reflection, phase shift, light polarization, optic
constant, IR spectrum

ABSTRACT: This is a continuation of earlier work by one of the
authors (Shklyarevskiy, Opt. i spektr. v. 14, 247, 1963 and earlier)
devoted to the phase difference produced when light is reflected from
a metallic surface. It is pointed out first that in the literature
there is just as much disagreement concerning the sign and magnitude
of the phase difference occurring in total internal reflection as in

Card 1/3

L 64502-65

ACCESSION NR: AP5012613

the case of ordinary reflection. To this end, the author first
measured the phase difference using apparatus described elsewhere
(Opt. i spektr. v. 9, 640, 1960).   A method is proposed for recon-
structing the linear polarization of the light reflected from a
metallic surface by means of compensation via total internal reflec-
tion.   This method makes it possible to measure the optical constants
of metals over a wide range of the spectrum (including the infrared)
in single reflection of light from a small sample.   It is shown that
the phase difference arising in total internal reflection is nega-
tive.   A formula is given for this phase and a plot of its dependence
on the angle of incidence.   A method is proposed, based on this con-
clusion, for measurement of optical constants on the basis of the
reconstruction of linear polarization, described by the authors
elsewhere (Opt. i spektr. v. 3, 361, 1957).   An advantage of the
method over the Drude method is that the measurements are made at
angles which are much smaller than the principal angles, making it
possible to go into the infrared region.   Orig. art. has: 3 figures
and 8 formulas.

Card 2/3

L-64502-65

ACCESSION NR: AP5012613

ASSOCIATION: None

SUBMITTED: 02Apr64   ENCL: 00   SUB CODE: OP

NR REF SOV: 014   OTHER: 003

Card 3/3

L 24268-66   EWT(1)/EWT(m)/EWP(t)   IJP(c)   JD/WW/JG/GG

ACC NR: AP6007017   SOURCE CODE: UR/0051/66/020/002/0355/0357

AUTHOR: Yarovaya, R. G.; Shklyarevskiy, I. N.

ORG: none

TITLE: Quantum absorption of light in copper

SOURCE: Optika i spektroskopiya, v. 20, no. 2, 1966, 355-357

TOPIC TAGS: light absorption, copper, absorption edge, absorption coefficient, refractive index, crystal defect, copper film

ABSTRACT: The quantum absorption of light in copper was investigated by a method used in an earlier paper (Opt. i spektr. v. 3, 361, 1957) to measure the index of refraction and the absorption coefficient of layers deposited in a vacuum (~10^{-5} mm Hg) in the spectral interval 0.45--2 μ, which includes the quantum absorption edge corresponding to the d-s electron transitions. Deviations from linearity of the refractive index and of the absorption coefficient were used as a measure of the quantum absorption. Two series of specimens were used, prepared at coating rates of ~100 Å/sec and several Å/sec. The results showed that the magnitude and position of the edge of the additional quantum absorption band depends strongly on the rate of deposition. The edge disappeared after annealing, thus indicating that the absorption band is connected with the structural defects of the metal. The results are discussed from the point of view of the band structure and are compared with those obtained for gold and silver. Orig. art. has: 2 figures.

SUB CODE: 20/   SUBM DATE: 01Jun65/   ORIG REF: 006/   OTH REF: 002

Card 1/1   UDC: 535.34: 546.56

L 42896-66   EWT(m)/T/EWP(t)/FTI   IJP(c)   JD/JG

ACC NR: AP6018449   SOURCE CODE: UR/0051/66/020/006/1074/1076

AUTHOR: Shklyarevskiy, I. N.; Yarovaya, R. G.; Kostyuk, V. P.; Lelyuk, L. G.

ORG: none

TITLE: Effect of deposition rate and annealing on the optical contents of precious metals

SOURCE: Optika i spektroskopiya, v. 20, no. 6, 1966, 1074-1076

TOPIC TAGS: high purity metal, metal film, metal deposition, optic constant, metal crystallization, metal physical analysis, metal vapor deposition, refractive index, absorption coefficient

ABSTRACT: At a high evaporation rate, the metal atoms reaching the substrate have a large reserve of energy which is expended in their migration on the substrate and formation of crystals; the result is a coarse-grained polycrystalline layer. Conversely, at a low evaporation rate, the kinetic energy of the atoms is insufficient for migration, hence a large number of crystallization centers is generated, producing a layer with fine crystalline structure. For the spectral region where the light absorption depends on free electrons, the optical constants are related to the effective collision frequency of electrons with other electrons, phonons and structural defects. Since grain boundaries are the predominant structural defects in a finely dispersed

UDC: 535.321 + 535.341 : 553.41

Card 1/2

L 42896-66

ACC NR: AP6018449

metal layer, it is obvious that the effective electron-defect collision frequency is
directly proportional to the size of the individual crystals. Consequently, the de-
position rate is directly proportional to the absorption coefficient and inversely
proportional to the refractive index. The authors measured optical constants for vacu-
um-deposited films of copper, silver and gold and found a good correspondence between
measured and predicted values. Annealing of a slowly deposited metal film changes its
optical properties to nearly the same values as for rapidly deposited film of the
same metal. There was practically no measurable change due to annealing of rapidly
deposited films. Reported discrepancies in measurement results of optical properties
of metals maybe attributed to the differences in deposition rates and the lack of sub-
sequent normalizing annealing. The authors conclude that refractive indices and ab-
sorption coefficients in metal films are functions of deposition rate and subsequent
annealing. The authors thank M. M. Noskov who called their attention to the part
played by the annealing of the specimens. Orig. art. has: 4 figures, 2 formulas.

SUB CODE: 11,20/   SUBM DATE: 15Apr65/   ORIG REF: 004/   OTH REF: 002

Card 2/2

L 04824-67   EWT(1)/EWT(m)/EWP(t)/ETI   IJP(c)   GG/WW/JD/JG

ACC NR: AP6026973

SOURCE CODE: UR/0051/66/021/002/0197/0203

AUTHOR: Shklyarevskiy, I. N.; Yarovaya, R. G.

ORG: none

TITLE: Quantum absorption of light in gold

SOURCE: Optika i spektroskopiya, v. 21, no. 2, 1966, 197-203

TOPIC TAGS: gold, light absorption, metal film , OPTIC CONSTANT

ABSTRACT: The optical constants of gold layers (refractive index μ and absorption $\mu\chi$) in the region of the edge of the d-s band of quantum absorption (0.36-2.5 μ) were measured. The layers were deposited in a vacuum of about 5×10^{-5} mm Hg at rates ranging from 1 to 100 Å/sec. From the frequency dependence of $\frac{\mu \cdot \mu\chi}{\lambda}$ it was found that the corresponding interband transitions are direct and allowed, and begin at an energy of 2.4 eV. A study of the effect of deposition rate followed by low-temperature annealing on the optical constants showed that additional, structure-sensitive bands of quantum absorption may arise in gold. The nature of these bands is discussed, and a new explanation is offered for the inconsistency existing in the literature on the subject of the concentration of conduction electrons in gold. Authors are grateful to V. K. Miloslavskiy for useful suggestions and discussion. Orig. art. has: 3 figures and 2 formulas.

SUB CODE: 20/ SUBM DATE: 22Apr65/ ORIG REF: 009/ OTH REF: 011

UDC: 535.34:546.59

Card 1/1

ACC NR: AP6033441   SOURCE CODE: UR/0051/66/021/004/0482/0436

AUTHOR: Shklyarevskiy, I. N.; Lupashko, Ye. A.

ORG: none

TITLE: Dispersion of the phase jump occurring when light is reflected from multi-layered dielectric coatings

SOURCE: Optika i spektroskopiya, v. 21, no. 4, 1966, 482-486

TOPIC TAGS: dielectric coating, optic dispersion, phase shift, light reflection, optic interference

ABSTRACT: This is a continuation of earlier work (Opt. i. spektr. v. 16, 888, 1964 and earlier) dealing with the effect of coating on metallic surfaces. The present article deals with dielectric coatings rather than metallic coatings, and is devoted to the determination of the magnitude, sign, and dispersion of the phase jump occurring when light is reflected from multilayered dielectric coatings. The dispersion of the phase jump for coatings consisting of 1, 3, 5, 7, 9, 11, and 13 layers was measured. The sign of the phase shift was determined by an interferometer method similar to that used for the metals, and its magnitude was determined by a relative method. The results of the experiment are in good agreement with the corresponding theoretical curves calculated by Vlasov's recurrence formulas (I. V. Grebenshchikov et al,

UDC: 535.312

Card 1/2

ACC NR: AP6033441

Prosvetleniye Optiki [Coated optics] OGIZ, GITL, 1946). The spectral dependence of the reflection coefficients of the same coatings was also measured and calculated. In this case the experimental values were somewhat lower than the calculated ones. Whereas the reflection coefficient of 11- and 13-layer coatings, which are usually employed interferometry, depends little on the wavelength in a wide region of the spectrum, a strong spectral dependence of the phase shift is observed. Orig. art. has: 4 figures and 9 formulas.

SUB CODE: 20/ SUBM DATE: 04May65/ ORIG REF: 009/ OTH REF: 005

Card 2/2

1. SHILYAEV, I.N.; SHEPELYAKOVSKII, K.Z.

2. USSR (600)

4. Automobile Industry

7. Automatic machine for the transfer of parts heated with high frequency currents. Avt. trakt.prom . no. 11 1952

9. Monthly List of Russian Accessions, Library of Congress, March, 1953. Unclassified.

SHEPELYANKOVSKIY, K.Z.; SHKLYAROV, I.N.

High-frequency surface hardening of flywheel gear rims. Avt.trakt.prom. no. 11:14a-b '53. (MLRA 6:11)
(Flywheels) (Hard-facing)

Shklyarov, I. N.

USSR/ Engineering – Heating and forging units

Card 1/1   Pub. 128 – 14/33

Authors   :   Shepelyakovskiy, K. Z., and Shklyarov, I. N.

Title   :   Automatic heating and forging units

Periodical :   Vest. mash. 36/1, 45-49, Jan 1956

Abstract   :   The Automobile Plant im. Stalin, designed and constructed several devices
                 for induction heating, automatic charging and heading of blanks and small
                 components for automobile engines. Illustrations and drawings of the above
                 mentioned units are given, with a description of their construction, methods
                 of installation and operation. One USSR reference (1955). Diagram;
                 drawings; illustrations.

Institution :   .....

Submitted   :   .....

ASSONOV,Aleksandr Danilovich,;SHEPELYAKOVSKIY, Konstantin Zakharovich,;
LANKIN,Petr Aleksandrovich,; YAITSKOV, S.A., inzh.; SEKLYAROV,
I.N.,inzh.; RABIN, M.O..inzh.; SENYUSHKIN, N.V.; ZHIVOTOVSKIY,
A.N.; BORISOV, N.I.; SHMYKOV, A.A., doktor tekhn. nauk,red.;
LOZINSKIY, M.G.,doktor tekhn.nauk,retsenzent,; MODEL', B.I.,tekhn.red.

[Gas cementation with induction heating] Gazovaia tsementatsiia
s induktsionnym nagrevom. Moskva, Gos. nauchno-tekhn. izd-vo
mashinostroit. lit-ry, 1958. 87 p.   (MIRA 11:12)
              (Cementation(Metallurgy))

113-58-7-15/25

AUTHOR: Shepelyakovskiy, K.Z., Candidate of Technical Sciences, and
          Shklyarov, I.N.

TITLE: High-Speed Induction Heating of Rods in Automatic Upsetting
          Presses (Skorostnoy induktsionnyy nagrev shtang v avtomatiche-
          skikh vysadochnykh pressakh)

PERIODICAL: Avtomobil'naya promyshlennost', 1958, Nr 7, pp 30-33 (USSR)

ABSTRACT: The author compares the advantages of contact and induction
           heating of rods in automatic upsetting presses, and favors
           the latter. The large sizes of rods required for automobile
           parts makes difficult the pre-heating processes by contact
           heating up to $1,000^{\circ}$C (Table 1). By way of comparison, the
           same data are presented for the induction heating process
           (Table 2). But here also the number of inductors (17 to 37),
           through which the upsetting machine is pushing the rod (Fig. 2),
           is high and the setup requires large dimensions. This was
           noticed in the Moscow Automobile Plant imeni Likhachev, while
           the Pervyy gosudarstvennyy podshipnikovyy zavod (First State
           Ball-Bearing Plant) has successfully tried a setup of smaller
Card 1/2   dimensions. The author sets forth general principles on

113-58-7-15/25

High-Speed Induction Heating of Rods in Automatic Upsetting Presses

        smaller setups.
        There are 4 tables, 3 diagrams, 2 graphs and 5 Soviet re-
        ferences.

ASSOCIATION: Moskovskiy avtozavod imeni Likhacheva (The Moscow Automobile
               Plant imeni Likhachev)

        1. Induction heating--Applications   2. Induction heating--Effectiveness
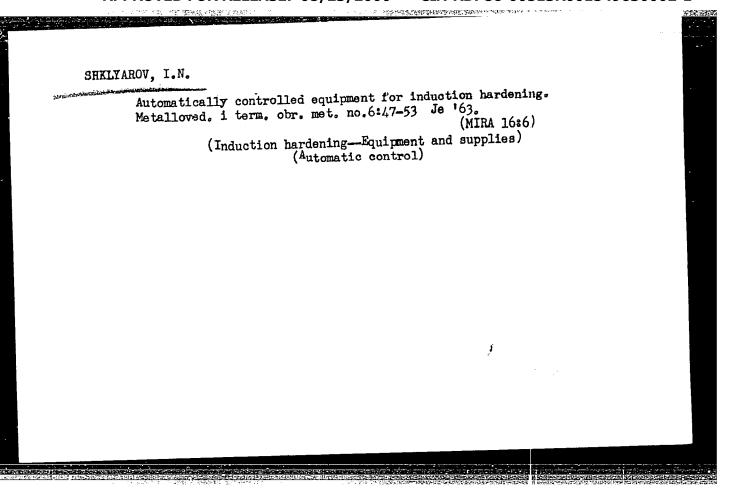
Card 2/2

YAKIMANSKIY, V.V., kand.tekhn.nauk; SHLYAPIN, N.A.; KIRICHINSKIY I.I.;
    SHKLYAROV, 1.N.; KALASHNIKOV, S.N., kand.tekhn.nauk

Using new techniques of hot rolling of teeth in making spiral bevel
gears. Avt.prom. no.9:39-43 S '60.   (MIRA 13:9)

1. Nauchno-issledovatel'skiy institut tekhnologii avtomobil'noy pro-
myshlennosti i Moskovskiy avtozavod imeni Likhacheva.
                (Gear shaping machines)

SHKLYAROV, I.N.

Automatically controlled equipment for induction hardening.
Metalloved. i term. obr. met. no.6:47-53 Je '63.
(MIRA 16:6)
(Induction hardening—Equipment and supplies)
(Automatic control)

L 12942-65   EWT(d)/EWT(m)/EWA(d)/T-2/EWP(t)/EWP(k)/EWP(b)   PF-4   MJW/
JD/HW   S/0122/64/000/003/0054/0058
ACCESSION NR: AP4048500

AUTHOR: Shklyarov, I. N. (Engineer)   B

TITLE: Hot rolling of bevel gear teeth (Experience of the Moscow Automobile Plant
im. Likhachev)

SOURCE: Vestnik mashinostroyeniya, no. 8, 1964, 54-58

TOPIC TAGS: hot rolling, bevel gear

Abstract: The Moscow Automobile Plant im. Likhachev and the Scientific Re-
search Institute for Automobile Industry Technology have jointly developed
a new hot-rolling method for forming the teeth of driven bevel gear. Gear-
rolling machines have been made and this technology for manufacturing the
spiral bevel gears of the main transmissions of ZIL-157 automobiles has been
adopted in production.
According to the new method of forming teeth, the gear blank is heated by
high-frequency current until the surface layer is in a plastic state. The
hot blank then undergoes successive local deformation (formation of teeth) by
a gear-rolling tool having the shape of a bevel gear, and the blank is
burnished continuously while the tool is in contact with the blank.

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L 12942-65
ACCESSION NR: AP4048500

Fundamental in this method is that the meshing of the blank and the tool should approximate the meshing of two interlinked toothed circular racks. The gear-rolling semiautomatic machine, designed to manufacture bevel gears according to the new method, has a capacity of 25 to 30 gears an hour. Diameter of the bevel gear to be rolled: from 175 to 350 mm; maximum length and height of the tooth to be formed: 50 and 20 mm, respectively; critical angles of the initial cone blanks of the bevel gears: 72-84° (Model 528 machine) and 60-72° (Model 535). Total power of the drive mechanisms of the machine is 30 kw. All operations (heating of the blank, rolling of the teeth, and removal of the finished article) are automated except for placing the workpiece on the vertical spindle.
To prevent oxidation of the workpiece's surface, which is heated to a plastic state, a provision is made in the design of the semiautomatic machine for heating and tooth-forming in a protective atmosphere of endothermic gas. This reduces formation of scale to a minimum.
A detailed description is given of the machine's operation, together with diagrams.
The machines described have been put into operation at the Moscow Automobile Plant im. Likhachev in lieu of preliminary gear cutting of the driven spiral bevel gear of the reduction gears of the ZIL-157 main transmission. The

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ACCESSION NR: AP4048500

blank for the new type of operation is 2.6 kg lighter than the blank used when teeth were cut in conventional manner.

The total time required to produce a bevel gear on the machine is about 112 sec, including 50 sec to heat up the blank; a 3-sec pause between termination of heating and the start on rolling the teeth; 20 sec to roll and burnish teeth on the blank; 6 sec to brake the work spindle and remove the gears from the machine; 30 sec to cool the gear-rolling tool; and 3 sec to lubricate the gear-rolling tool with graphite.

The spiral bevel gears are made of 12Kh2N4A (2% Cr 4% Ni · 12% C) steel. During gear-rolling and burnishing the hardness of the teeth increases and attains HRC 30-35. To facilitate the process of final gear cutting, the driven gears after gear rolling undergo high-temperature tempering (in a protective atmosphere to prevent formation of scale) to a hardness not exceeding HRC 20. Intermediate heat treatment is advisable only if the gears are made of steels of the 12Kh2N4A type. If steels of other grades are used, this operation is not always economically advisable.

After high-temperature tempering the gears with rolled teeth are machined on an eight-spindle semiautomatic vertical lathe. Further machining is the same as that for gear blanks undergoing preliminary gear cutting, and is performed

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ACCESSION NR: AP4048500

on the same equipment and under the same procedure. The new method obviates
the labor-consuming operation of preliminary gear cutting. The accuracy of
gears with rolled teeth -- after finishing work -- is the same as that of
gears with pre-cut teeth.
After finish cutting of the rolled teeth, the gear undergoes heat treatment
and the hole is burnished. Comparative tests have showed that gears with
rolled teeth have static and fatigue bending strength 15 to 20% higher than
do gears with pre-cut teeth.
Hot rolling of bevel gear teeth permits significant saving of money and metal
to be effected.

ASSOCIATION: none

SUBMITTED: 00   ENCL: 00   SUB CODE: IE, MM

NO REF SOV: 000   OTHER: 000   JPRS

Card 4/4

L 15213-66   EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(h)   JD

ACC NR: AP6002912   SOURCE CODE: UR/0286/65/000/024/0074/0074

INVENTOR: Shepelyakovskiy, K. N.; Stroganov, K. V.; Shklyarov, I. N.; Orlov, I. V.; Nikonov, V. F.; Assonov, A. D.

ORG: none

TITLE: Steel for surface-hardened parts. Class 40, No. 177083

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 74
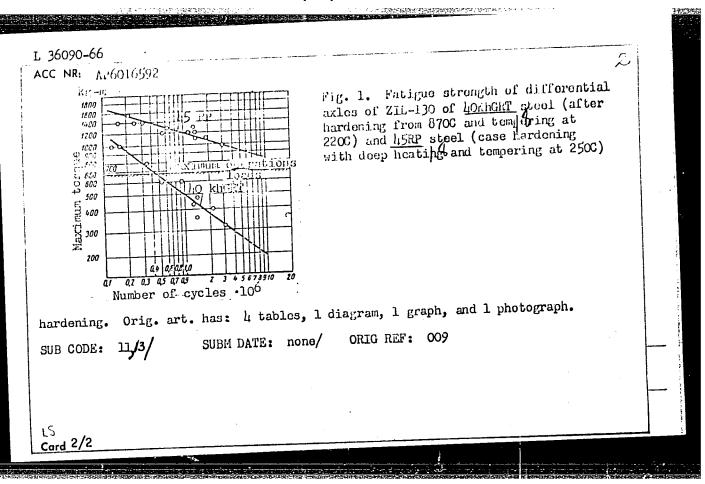
TOPIC TAGS: steel, surface hardened steel, manganese containing steel, silicon containing steel, chromium containing steel, shallow hardenable steel

ABSTRACT: This Author Certificate introduces a steel for surface-hardened parts containing 0.4—1.2% carbon and alloyed with manganese, silicon, and chromium. To obtain steel with a specified hardenability, one of three alloying elements is added in a specified amount and the content of the other two is limited. For example, in steel containing 0.3—1.4% manganese, the chromium and silicon contents are limited to 0.15% and 0.17%, respectively. Steel with 0.3—1.4% silicon should contain 0.15% chromium and 0.20% manganese, and steel with 0.3—1.8% chromium should contain 0.20% manganese and 0.17—0.27% silicon.   [AZ]

SUB CODE: 11/ SUBM DATE: 29Dec60/ ATD PRESS: 4190

Card   1/1

L 36090-66   EWT(m)/T/EWP(t)/ETI   IJP(c)   JD

ACC NR: AP6016592   (A, N)   SOURCE CODE: UR/0129/66/000/005/0033/0037

AUTHORS: Shepelyakovskiy, K. Z.; Shklyarov, I. N.; Kal'ner, V. D.

ORG: Moscow Automobile Works (Moskovskiy avtomobil'nyy zavod)

TITLE: Case hardening with deep induction heating--a promising method for heat treatment of steels

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 5, 1966, 33-37

TOPIC TAGS: case hardening, fatigue strength, tempering, steel, induction hardening, carbon steel/ 45RP steel, 47GT steel, 45G steel, 40KhGRT steel, 55PP carbon steel

ABSTRACT: A new method of case hardening with deep induction heating is described. This method was developed at the Central Scientific Research Institute of Ferrous Metallurgy (TsNIIChMet). The specific power is 0.05--0.2 kW/cm^2; the heating rate in the area of phase transitions is 2--10 deg/sec; and the heating time is 20--100 sec. Steel 55PP of reduced hardenability and steel 45RP of regulated hardenability are used. It was found that the strengthened core increases the strength of the part, the thinner the hardened layer. Case-hardened 45RP steel was used for the differential axles of ZIL-130 automobiles (see Fig. 1). The hardening temperature was about 900C for 70 sec. The axles were then tempered at 250C for 1.5 hrs. The method has substantial advantages over straight-through heat treatment and conventional case

Card 1/2   UDC: 621.78.5

L 36090-66

ACC NR: AP6016592

Fig. 1. Fatigue strength of differential axles of ZIL-130 of 40AhGhT steel (after hardening from 870C and tempering at 220C) and 45RP steel (case hardening with deep heating and tempering at 250C)

hardening. Orig. art. has: 4 tables, 1 diagram, 1 graph, and 1 photograph.

SUB CODE: 11/3/   SUBM DATE: none/   ORIG REF: 009

LS
Card 2/2
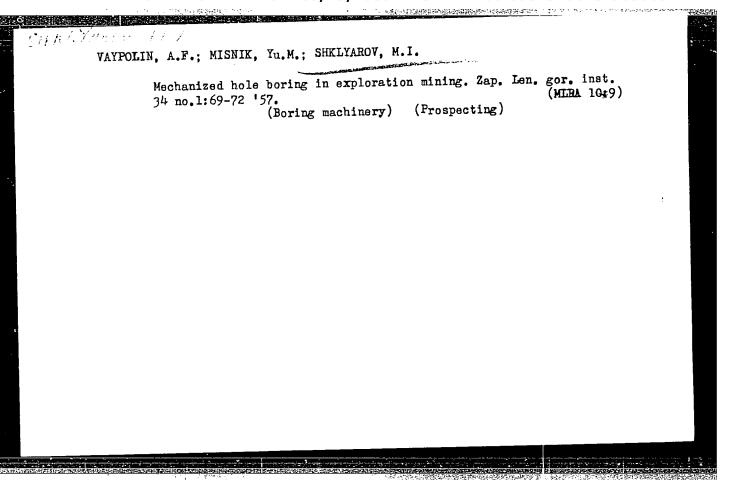
GORDON, G.I.; SHKLYAROV, I.V.

     Automatic dust-settling system. Lit. proizv. no.5:15-16 '62.

                                              (MIRA 16:3)

    (Dust--Prevention)   (Automatic control)

VAYPOLIN, A.F.; MISNIK, Yu.M.; SHKLYAROV, M.I.

Mechanized hole boring in exploration mining. Zap. Len. gor. inst.
34 no.1:69-72 '57.   (MIRA 10:9)
                (Boring machinery)   (Prospecting)

FIRSOV, Ye. F.; CHERTKOV, N. N.; SHKLYAROV, S. E. (Kursk)

Clinical aspects and diagnosis of apical Pancoast's tumor of the
lung. Klin. med. no.9:90-94 '61.   (MIRA 15:6)

1. Iz kurskogo oblastnogo onkologicheskogo dispansera (glavnyy
vrach T. S. Kondrasheva) i kurskoy oblastnoy klinicheskoy
bol'nitsy (glavnyy vrach L. A. Chunikhin)

(LUNGS—TUMORS)

ASTAF'YEV, V.I.; FIRSOV, Ye.F.; SHKLYAROV, S.Z. (Kursk)
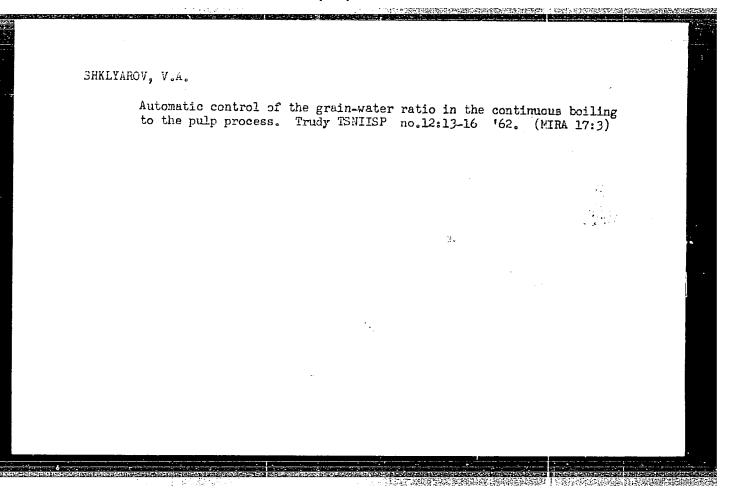
Hyperthrophic osteoarthropathy in pulmonary neoplasms (Marie-
Bamberger syndrome). Klin.med. 40 no.6:90-95 Je '62.

(MIRA 15:9)

1. Iz kliniki gospital'noy khirurgii (zav. - prof. A.V. Kholod)
Kurskogo meditsinskogo instituta (rektor - prof. A.V. Savel'yev)
i Kurskogo oblastnogo onkologicheskogo dispansera (glavnyy vrach
T.S. Kondrasheva).

(LUNGS—TUMORS) (BONES—DISEASES) (JOINTS—DISEASES)

SHKLYAROV, V.A.

Automatic control of the grain-water ratio in the continuous boiling
to the pulp process. Trudy TSNIISP no.12:13-16 '62. (MIRA 17:3)

YAKOVLEVA, Ye.K.; BASKINA, N.F.; BOBROVSKAYA, M.N.; KRESLING, Ye.M.; MYAGER,
        V.K.; SHKLYAROVA, E.D.; NIKOLAYEVA, K.N.

Use of hemohormonestimulin in the clinical aspects of neuroses. Akt.
vop.perel.krovi no.7:195-198 '59.   (MIRA 13:1)

1. Klinika nevrozov i pogranichnykh sostoyaniy Gos.psikhonevrolo-
gicheskogo nauchno-issledovatel'skogo instituta imeni V.M. Bekhtereva
(direktor i nauchnyy rukovoditel' - chlen-korrespondent AMN SSSR
prof. V.N. Myasishchev).
              (HORMONES, SEX)   (NEUROSES)

SHKLYAROVA, M. M.

Winter garden in the "Oktiabr'" Motion Picture Theater in
Astrakhan. Biul. Glav. bot. sada no.47:101 '62.
(MIRA 16:1)

1. Glavnyy botanicheskiy sad AN SSSR.
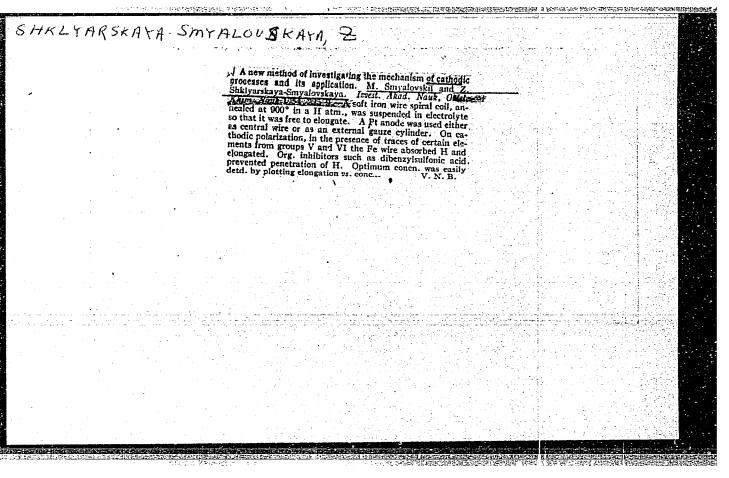
(Astrakhan--Tropical plants)

SHKLYARSKAYA-SMYALOVSKAYA, Z. and SMYALOVSKIY M.

"Study of Diffussion of Hydrogen in Iron from Observations of Elongation of the Specimen"
Byull. Polskoy Akad. Nauk, Otd. II, No 3-4, 1953, pp 155-156

A method facilitating the evaluation of the effect of various admixtures on penetration of hydrogen into iron electrode during electrolysis is presented. The method is based on the relation binding the elongation of the iron filament under a given load to the hydrogen abundance. (RZhFiz, No 11, 1954)

SO: W-31187, 8 Mar 55

SHKLYARSKAYA-SMYALOUSKAYA, Z

A new method of investigating the mechanism of cathodic processes and its application. M. Smyalovskii and Z. Shklyarskaya-Smyalovskaya. Invest. Akad. Nauk. O____ ___ _____ _____A soft iron wire spiral coil, annealed at 900° in a H atm., was suspended in electrolyte so that it was free to elongate. A Pt anode was used either as central wire or as an external gauze cylinder. On cathodic polarization, in the presence of traces of certain elements from groups V and VI the Fe wire absorbed H and elongated. Org. inhibitors such as dibenzylsulfonic acid prevented penetration of H. Optimum concn. was easily detd. by plotting elongation vs. conc...   V. N. B.

SHKLYARSKIY, D.O.; CHENTSOV, N.N.; YAGLOM, I.M.

[Selected problems and theorems in elementary mathematics. Part 2. Geometry
(planimetry)] Izbrannye zadachi i teoremy elementarnoi matematiki. Chast'
2. Geometriia (planimetriia). Moskva, Gos.izd-vo tekhn.-teoreticheskoi lit-
ry, 1952. 380 p.
(MLRA 6:7)
(Geometry, Plane)

SHKLYARSKIY, D.O.; CHENTSOV, N.N.; YAGLOM, I.M.; RYVKIN, A.Z., redaktor;
GAVRILOV, S.S., tekhnicheskiy redaktor.

[Selected problems and theorems of elementary mathematics. Pt.3.Solid
geometry] Izbrannye zadachi i teoremy elementarnoi matematiki. Chast'3.
Geometri a (Stereometriia). Moskva, Gos.izd-vc tekhniko-teoreticheskoi
lit-ry, 1954. 267 p. (Biblioteka matematicheskogo kruzhka, no.3.)
        (Geometry, Solid)   (MIRA 8:4)

SHKLYARSKIY, F. N.

Mining

DECEASED *1955*

see ILC

Shaposhnik, N. F.

Shaposhnik, N. F. "On the problem of the nature of changes in the static strength of scraper winches", Nauchni Zapiski Donetsk gornogo in-ta, Vol. XXII, Part 2, 1948, p. 191-98.

SO: U-4393, 19 August 53, (Letopis 'Zhurnal 'nykh Statey', No. 22, 1949).

SHKLYARSKIY, L.F., dotsent, kandidat tekhnicheskikh nauk.

Automatic control of the electric drive of endless bucket line
dredges. Elektrichestvo no.1:22-25 Ja '57.   (MLRA 10:2)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche im. Baumana.
        (Automatic control)
    (Dredging machinery--Electric driving)

SHKLYARSKIY, L.F.

Loading diagrams and power determination for the main electric drive
of a multibucket dragline. Zap.Len.gor.inst. 35 no.1:8-27 '57.
(MIRA 10:10)
(Excavating machinery--Electric driving)

8(2)

AUTHOR: Shklyarskiy, L. E., Docent, Candidate of   SOV/105-58-11-11/28
            Technical Sciences

TITLE: Transients in an Electric Drive With Reactor Control of the
            Winch in a Multi-Scoop Dredger (Perekhodnyye protsessy
            v elektroprivode s drossel'nym upravleniyem lebedki
            mnogocherpakovoy dragi)

PERIODICAL: Elektrichestvo, 1958, Nr 11, pp 47 - 51 (USSR)

ABSTRACT: In this paper, a simplified method of computing
            transients in such apparatus is presented. This method
            is applicable in practical cases. The simplifications
            adopted, apart from those known (Refs 4,5), are described.
            The method presented of computing transients in an
            asynchronous drive system with bias magnetization
            reactors connected asymmetrically to two phases of
            the rotor is based upon the use of static characteristics,
            which can be constructed according to the catalogue data
            of the motor and of the bias magnetization chokes.
Card 1/2   Two cases are considered : 1) The static torque is

SHKLYARSKIY, L. F., Doc Tech Sci -- (diss) "Electric drive of multi-scoop dredges." Moscow, 1960. 24 pp with graphs; (Ministry of Higher and Secondary Specialist Education RSFSR, Moscow Order of Lenin and Order of Labor Red Banner Technical College im N. E. Bauman); 150 copies; price not given; list of author's works at end of text (10 entries); (KL, 22-60, 135)

L 14431-66   EWT(m)/T/EWP(t)/EWP(z)/EWP(b)   IJP(c)   JD/HW
ACC NR: AP6002647   (N)   SOURCE CODE: UR/0021/65/000/011/1465/1467

AUTHOR: Danylov, V. N. -- Danilov, V. N.; Slovikovs'kyy, H. F. -- Slovikovskiy, G. F.;
Shklyaruk, L. I.

ORG: Kiev Institute of Technology (Kyyirs'kyy tekhnologichnyy instytut); Kiev Polytechnic
Institute (Kyyirs'kyy politekhnichnyy instytut)

TITLE: A study of metal regression after hardening

SOURCE: AN UkrRSR. Dopovidi, no. 11, 1965, 1465-1467

TOPIC TAGS: hardness, electric conductivity, annealing, silver, nickel

ABSTRACT: The authors investigated metal regression after hardening on technically pure
nickel and 99.99% pure silver. Electrical resistivity and microhardness measurements are
used to show that in the case of technically pure metals the regression curve after annealing
hardening has at room temperature a maximum which is absent in pure and deformed metals.
This microhardness maximum can be explained by interactions of frozen vacancies with
dislocations. The maximum on the electrical conductivity regression curve can be explained

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L 14431-66
ACC NR: AP6002647

by mutual interactions among vacancies and their interactions with impurities and dis-
locations. The paper was presented by Academician <u>B. E. Paton.</u> Member of AN UkrSSR.
Orig. art. has: 5 figures.

SUB CODE: 11 / SUBM DATE: 28May64 / ORIG REF: 003 / OTH REF: 007

Card 2/2

L 14590-66   EWT(d)   IJP(c)

ACC NR: AP5028767   SOURCE CODE: UR/0376/65/001/011/1537/1543

AUTHORS: Rvachev, V. L.; Shklyarov, L. I.

ORG: Khar'kov Institute for Mining Machinery Construction, Automation, and Computer Engineering (Khar'kovskiy institut gornogo mashinostroyeniya, avtomatiki i vychislitel'noy tekhniki)

TITLE: Use of the Bubnov-Galerkin method to solve boundary value problems for regions of complex form

SOURCE: Differentsial'nyye uravneniya, v. 1, no. 11, 1965, 1537-1543

TOPIC TAGS: approximation calculation, differential equation, elliptic differential equation

ABSTRACT: For purposes of obtaining approximate solutions to certain elliptic partial differential equations, the authors consider the problem of finding $\omega(x,y)$, continuous, with continuous partial derivatives in the region whose boundary is composed of smooth arcs with equations

$$\varphi_1(x, y) = 0, \ \varphi_2(x, y) = 0, \ \ldots, \ \varphi_n(x, y) = 0,$$

where φ_i have continuous and bounded partial derivatives, with $\omega(x,y) > 0$ inside and $\omega(x,y) = 0$ on the boundary. This is solved by using the technique of R-functions -- the approximate solution of the differential equation being of the form

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L 14590-66

ACC NR: AP5028767

$$u^*(x, y) = \omega(x, y) \sum_{i=1}^{n} c_i \psi_i(x, y),$$ (1)

where ψ_1 $\psi_2 = x$; $\psi_3 = y$; $\psi_4 = x^2$; ...; Orig. art. has: 3 figures and 5 formulas.

SUB CODE: 12/ SUBM DATE: 27May65/ SOV REF: 012

Fw

Card 2/2

BUDRYK Vitold; LITVINISHIN, Yanhi; KNOTTE, Stanislav; SALUSTOVICH Antoni.
SHKLYARSKIY, M.F., inzhener [Translator]; AVERSHIN, S.G., professor,
redaktor; SLAVOROSOV A.Kh., redaktor; PROZOROVSKAYA, V.I.. tekhni-
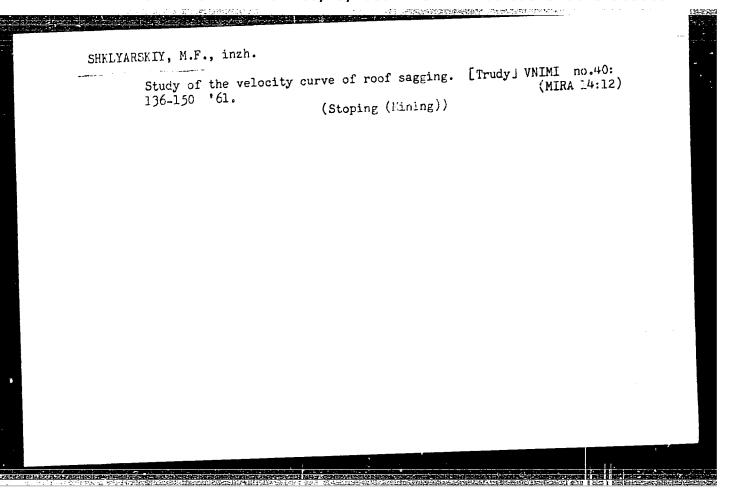cheskiy redaktor.

[Problems in calculating surface displacements caused by mine work.
Translated from the Polish] Voprosy rascheta advishenii poverkhnosti
pod vliianiem gornykh razrabotok, Perevod s pol'skogo M.F.Shkliar-
skogo, pod red.S.G.Avershina, Moskva, Gos.nauchno-tekhnicheskoe izd-
vo lit-ry po ugol'noi promyshl., 1956.63 p.   (HLRA 9:5)
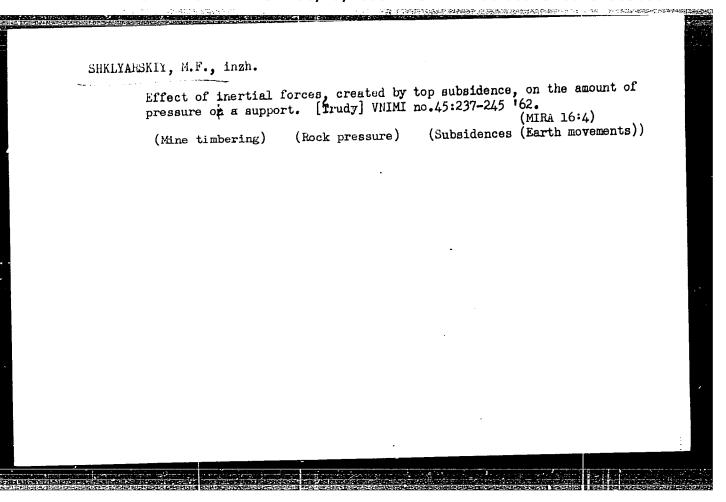   (Poland--Earth movements)

KUZNETSOV, Georgiy Nikolayevich; BUD'KO, Mariya Nikolayevna;   . .
    FILLIPOVA, Antonina Aleksandrovna; SHKLYARSKIY, Mechislav
    Feliksovich; AVERSHIN, S.G., otv.red.; LOMILINA, L.N.,
    tekhn.red.

[Studying manifestations of rock pressure by means of models]
Izuchenie proiavlenii gornogo davleniia na modeliakh. Moskva,
Ugletekhizdat, 1959. 282 p.   (MIRA 12:8)
            (Geological modeling)
        (Subsidences (Earth movements))

SHKLYARSKIY, M.F., inzh.

Study of the velocity curve of roof sagging. [Trudy] VNIMI no.40:
136-150 '61.   (MIRA 14:12)
                    (Stoping (Mining))

SHKLYARSKIY, M.F., inzh.

Effect of inertial forces, created by top subsidence, on the amount of pressure on a support. [Trudy] VNIMI no.45:237-245 '62.
(MIRA 16:4)

(Mine timbering)   (Rock pressure)   (Subsidences (Earth movements))

ACC NR: AP6035958   (A,N)   SOURCE CODE: UR/0129/66/000/010/0062/0063

AUTHOR: Blanter, M. Ye.; Shklyarov, M. I.

ORG: All-Union Machine Building Correspondence Institut (Vsesoyuznyy zaochnyy mashinostroitel'nyy institut)

TITLE: Combined [mechanothermal] treatment of steel to high strength

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 10, 1966, 62-63

TOPIC TAGS: carbon steel, ~~mechanothermal treatment~~, ~~steel~~ plastic deformation, ~~steel~~ ~~mechanothermal~~ treatment, steel property/45 carbon steel

ABSTRACT: The effect of mechanothermal treatment, i.e. plastic deformation at room temperature, and subsequent heat treatment on the mechanical properties of 45 carbon steel has been investigated. Steel specimens, 1 x 9 x 100 mm, heat treated to various structures (granular, pearlite, troostite-sorbite, or martensite) were cold rolled with 10, 30 or 50% reduction, rapidly heated to 800, 900, 1000 or 1100C, and water quenched. This was followed by tempering at 200C. It was found that the strength of specimens rolled with 50% reduction increased with the increase of annealing temperature from 800 to 900C. For instance, the tensile strength of specimens with a pearlitic structure increased from 210 to 245 kg/mm^2, and those with a troostite-sorbite structure, to 225 kg/mm^2, at an elongation of 4% in both cases. Further increases in temperature to 1100C decreased the tensile and yield strengths and

Card 1/2   UDC: 669.14.018:621.789

ACC NR: AP6035958

elongation dropped to 1%. The increase of reductions at first lowers the strength characteristics then, starting from 10% to 50% reduction, the characteristics increase steadily. Thus, the steel strength can be improved under certain predetermined conditions of plastic deformation and subsequent hardening with a rapid cooling to austenitizing temperature. Orig. art. has: 2 figures.

SUB CODE: 11, 13/ SUBM DATE: none

Card 2/2